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July 18, 1990

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TO: Dick Cunningham
FROM: David Hallock DH
SUBJECT: Results of the 1990 Water Quality Index Analysis

This memo describes the Water Quality Index (WQI), records the procedures used to produce the 1990 WQI, and presents the results of the analysis.

Introduction

The WQI is a unitless number, ranging from 0 to 100, which is derived primarily from data collected by the Ambient Monitoring Section (AMS) of Environmental Investigations and Laboratory Services (EILS); however, data collected by USGS, METRO, and USBR were also used in the 1990 analysis. Scores are determined by comparing measured values to specified criteria. Criteria were developed by a national study group and modified to better evaluate Washington's water quality. In general, the criteria are based on Washington State Water Quality Standards for Class A waters. The following variables were included in the 1990 WQI:

- | | |
|-----------------------|------------------------|
| 1. Temperature | 2. Oxygen |
| 3. Bacteria | 4. pH |
| 5. Turbidity | 6. Nutrients (N and P) |
| 7. Suspended Sediment | 8. Ammonia Toxicity |

For marine stations, only the first five variables were included.

The higher the WQI, the worse the water quality. For the first four variables above, an index below 20 implies compliance with state Class A standards. For the other variables, state standards do not exist or are not compatible with the WQI analysis. In general, scores between 0 and 20 meet the goals of the Federal Water Pollution Control Act, scores between 20 and 60 are considered marginal, and scores over 60 are unacceptable.

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The WQI is produced for each variable by a computer program developed by Ray Peterson, EPA, Region X. WQIs are determined by converting raw data to an index score based on the criteria curve for that variable. The computer program then calculates a monthly WQI by averaging the data for each month in the period selected. For example, for a three-year period the January WQI would be an average of three Januaries. A monthly overall WQI is calculated by averaging the monthly WQI for each variable with a penalty applied for values over 20, excluding turbidity. The final WQI for a given variable is the average of the WQI's for the highest three consecutive months. The final overall WQI is the average of the highest three consecutive months of the monthly overall WQI.

Procedures Used in the 1990 WQI Analysis

The analyst can determine the variables to be evaluated, the number of years to include in the index, the criteria curve for each variable, and the weight of each variable in the overall WQI. The analyst can also use different criteria curves for different seasons.

For the 1990 analysis, "current" stations had at least one sample per quarter for four consecutive quarters (three consecutive quarters for marine stations) collected any time in the three water years (WY) prior to the analysis (WY 1990). This three-year average masks anomalies in the data set and the effects of low- or high-water years but may also mask actual changes in water quality. The 1988 WQI analysis used five years for current stations but I felt that three years would provide a more accurate assessment of current conditions. "Historic" stations were those with sufficient data in the five years preceding the current period (WY 1982 through 1986). Those stations where no data has been collected since WY 1981 are not included in the 1990 WQI. Historic station WQI's should be used with caution because of possible changes since those stations were sampled last. Monitoring data from USGS, USBR, and METRO were used where available. If data from both Ecology and another agency were available, the data was aggregated from both data sets prior to running the analysis.

I used the same criteria curve for a given variable as was used in the 1988 analysis. The actual curves used are available on request. Most variables have several criteria curves (for example, one for cold water, one for warm water, one for spawning and rearing, etc.) In general, only the cold water curve corresponds to state standards.

All variables were weighted equally in determining the overall WQI. That is, temperature, for example, was not considered more important than turbidity. Nutrients and suspended sediment were compared to more stringent standards from June through October and less stringent standards from November through May. Some streams were

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designated as "glacial" which set the maximum WQI for turbidity and suspended sediment at 25.

General Comments

There is great potential for misusing any index. The following points should be considered carefully before interpreting the WQI:

1. An index greater than 20 for temperature, oxygen, bacteria, or pH indicates water quality exceeded state standards at least once and probably several times. Criteria for other variables are not based on standards.
2. Because the WQI is the average of the highest three consecutive months, the index may be below 20 even though violations of standards occurred. Similarly, violations may be masked because the monthly index is an average for the period evaluated.
3. The current station WQI's are, in most cases, based on three years of data. The WQI's do not, therefore, indicate water quality for any given year. The degradation (or improvement) of a stream in WY 1989 may not be reflected in the 1990 WQI. For this reason, trends should not be inferred from successive WQI's without testing against raw data. In addition, a trend analysis based on WQI may be biased because of changes in the procedures used to determine the WQI (standards changes, use of different curves, different periods of analysis, etc.).
4. The overall WQI is not a simple mean but includes a penalty factor for WQI's greater than 20 (excluding turbidity).
5. The WQI is based on data from a single station and in many cases may not be representative of an entire stream. Caution should be used in extrapolating the index to entire basins or sub-basins.

Results

The results of the 1990 Water Quality Index analysis are presented in the attached tables. Table 1 contains the WQI sorted by Water Body Tracking System Number (WBTS). Table 2 contains the WQI sorted by Department of Ecology Region and sub-sorted by Ambient Monitoring Station number. In these first two tables, the approximate area assessed by a particular station is indicated by the segment size (miles

for freshwater stations and square miles for marine stations). Whether or not a station was considered water quality limited in the 1988 305(b) report is indicated in the "WQL in 1988" column. "Comments and possible sources of WQIs greater than 20" is based largely on remarks from Ecology's regional offices. Table 3 contains a listing of the ten stations in the state with the highest WQI (lowest water quality) for each variable.

The South Fork of the Palouse River in Pullman (34B110) had the highest water quality index in the state (WQI = 100), unchanged from the 1988 report. This score, the highest possible, resulted from high bacteria and especially high nutrients. With the exception of turbidity, this station was not on the "worst ten" list for any other variable.

The two Mill Creek (King County) stations had nearly as high a WQI score as the South Fork of the Palouse River, resulting primarily from low dissolved oxygen levels, high fecal coliform bacteria, and high nutrients. These results, from stations at river miles 3.1 and 4.7, indicate significant problems in the lower reaches of Mill Creek.

The 1990 WQI indicated low oxygen problems at more stations than any other variable analyzed. However, of the 56 stations with oxygen WQI's greater than 20, all but six were marine stations. Marine stations are particularly susceptible to high WQI scores for dissolved oxygen because the index is an average of all depths sampled (usually 0, 10, and 30 meters), and does not compensate for the possibility of naturally low oxygen below the photic zone. (Note, however, that the Water Quality Standards for dissolved oxygen in marine waters make no reference to depth.)

Besides oxygen, bacteria and temperature had the most stations with scores greater than or equal to 20 (42 and 40, respectively). In other words, high fecal coliform bacteria and high temperatures were the factors most often responsible for the failure of a station to meet the goals of the Federal Water Pollution Control Act. The total number of stations evaluated was 177.

Recommendations

1. The consistent poor water quality in the South Fork of the Palouse River in Pullman has been discussed in a receiving water survey by Joy (1987). The Ambient Monitoring Section should consider adding stations to its rotating network based on the results of that survey. One possible station is Paradise Creek, the receiving water for the Moscow, Idaho WWTP which Joy identified as the most significant source of nutrients to the upstream reach of the South Fork.

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2. Adjusting oxygen water quality standards and WQI criteria to account for the effect of depth in marine systems on dissolved oxygen concentrations should be considered.
3. Future WQI reports should discuss the meteorological characteristics of the water years included in the analysis of "current" stations. This is particularly important when only three years of data are used. Whether these years were drier or wetter, or warmer or colder than normal will influence the results of the WQI.
4. The criteria curves used in the WQI were developed more than 10 years ago without documentation. These curves need to be re-evaluated. In addition, consideration should be given for using different curves in different ecoregions (Omernik and Gallant 1986). It is not practical to compare a stream like the Walla Walla River to the same standards as the Nisqually River.

References

- Joy, J. 1987. A water quality assessment and receiving water survey of the South Fork of the Palouse River at Pullman, September 1986. Wash. Dept. of Ecology, Water Quality Investigations Section report, Olympia, WA. 40 pp.
- Omernik, J. M. and A. L. Gallant. 1986. Ecoregions of the Pacific Northwest. USEPA publication, EPA/600/3-86/033, Environmental Research Laboratory, Corvallis, OR. 39 pp.

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Table 1. 1990 Water Segment Analysis Using the Water Quality Index. Sorted by Water Body Tracking Systems (WSTS) number. Note: Indicates insufficient data, 'C' and 'H' by station number indicate data is current (last three years) or historical (last eight years), respectively.

Seg. Yrs	Seg. in	Size in	Susp Amno	Over	In	Comments and Possible Sources							
WSTS	Number	Station Name	Class (mi)	Anal Temp Oxy	pH	Bact Nutr Turb Sed Tox	all	1988	of Wols Greater Than 20				
DRA001 C	WA-01-0020	Dreyton Hbr Entrance Channel	A	4.2	2	11	20	15	22	*** 1	*** 1	N	Industrial sewage and waste (fish processing) (recently corrected).
BLL008 C	WA-01-0040	Bellingham Bay at Post Point	A	63.5	2	6	24	18	3	*** 1	*** 1	N	
BLL009 C	WA-01-0040	Bellingham Bay nr Pt. Frances	A	63.5	3	9	16	12	0	*** 1	*** 1	N	
BLL006 C	WA-01-0050	Bellingham Bay @ Nun Buoy Rd.	B	3.6	2	12	24	17	14	*** 4	*** 4	Y	Georgia Pacific Corp. pulp mill. Urban runoff.
01A050 C	WA-01-1010	Nooksack R @ Brennen	A	28.2	3	11	7	4	34	15	15	Y	Nonpoint agr. runoff, dairy wastes, forest practices. Glacial fed.
01A120 C	WA-01-1020	Nooksack R @ No Cedarville	A	8.4	3	5	6	3	12	12	16	Y	Forest practices. Glacial fed.
01D070 C	WA-01-2010	Sumas R nr Huntingdon BC	A	11.0	3	13	18	4	50	39	7	Y	Agr. runoff. Asbestos from natural slides.
HR0001 C	WA-02-0010	Haro Strait at Skipjack Island	AA	425.0	2	5	27	8	4	*** 1	*** 1	Y	
SJ1001 C	WA-02-0010	San Juan Channel at Reid Rock	AA	425.0	2	6	25	7	7	*** 1	*** 1	Y	
GRG002 C	WA-02-0010	Str. of Georgia N. of Pateros	AA	0.0	1	7	2	6	1	*** 1	*** 1	Y	Frazer River plume.
OJA060 C	WA-03-1010	Shagit R nr Mount Vernon	A	25.6	3	5	7	5	12	8	7	Y	
03B050 C	WA-03-2010	Samish R nr Burlington	A	31.1	3	5	8	6	35	12	9	Y	Cattle (dairy). Septic tank failures (?).
04A060 C	WA-04-1010	Skagit R @ Concrete	AA	10.9	3	4	6	4	5	6	5	Y	
04B070 C	WA-04-1020	Baker R @ Concrete	AA	1.2	3	7	8	5	2	6	3	Y	
04C070 C	WA-04-1030	Sauk R nr Rockport	AA	13.2	3	2	6	4	11	8	13	Y	Glacial fed. Natural slides.
04A100 C	WA-04-1090	Skagit R @ Marblemount	AA	10.9	3	1	6	5	5	4	2	Y	
05A070 C	WA-05-1010	Stillaguamish R nr Silvana	A	17.8	3	11	10	9	22	12	9	Y	Nonpoint agr. sources. Upstream Landslide (Deer Cr).
05B070 C	WA-05-1020	NF Stillaguamish @ Cicero	A	31.2	3	6	8	4	20	12	14	Y	Upstream Landslide (Deer Cr).
05A090 C	WA-05-1040	SF Stillaguamish @ Arlington	A	15.9	3	8	9	5	22	10	7	Y	Nonpoint agr. sources. Soil erosion.
SAR003 C	WA-06-0010	Saratoga Passage off East Pnt	A	66.6	3	6	25	9	0	*** 1	*** 1	Y	
PWN001 C	WA-06-0020	Penn Cove near Penn Cove Park	A	5.2	2	8	43	13	1	*** 1	*** 1	Y	
HLW001 C	WA-06-0030	Holmes Harbor at Honeymoon Bay	A	9.5	2	7	35	13	0	*** 1	*** 1	Y	
PSS008 C	WA-07-0010	Pt Gardner Bay at Pier 3	B	0.2	2	11	54	8	42	*** 1	*** 1	Y	Combined sewer overflows. Meyerhouse and Scott Paper pulp mills. Urban runoff.
PSS015 C	WA-07-0010	Snohomish R at Highway 99 Brdg A	A	0.2	2	22	46	34	34	*** 3	*** 3	Y	Combined sewer overflows. Meyerhouse and Scott Paper pulp mills. Urban runoff.
PSS020 C	WA-07-0010	Ebey Slough near Marysville	A	0.2	2	14	43	31	13	*** 6	*** 6	Y	Combined sewer overflows. Meyerhouse and Scott Paper pulp mills. Urban runoff.
07A090 C	WA-07-1020	Snohomish R @ Snohomish	A	5.3	3	12	8	12	24	12	6	Y	Ag. runoff. Cattle (dairy, etc).
07B055 C	WA-07-1030	Pilchuck R @ Snohomish	A	26.8	3	17	7	7	23	12	8	Y	Low summer flows.

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WBTS Number	Station Name	Seg. Yrs	Seg. in	Susp Amno	Over all	Comments and Possible Sources									
			Class (mi)	Areal Temp DRY	pH	Bact Nutr Turb Sed Tox	1988 of WBTS Greater Than 20								
07A111 H	WA-07-1050 Snohomish R nr Monroe (USGS)	A	7.1	4	10	19	25	13	7	9	3	15	Y	Cattle (dairy).	
07D070 C	WA-07-1060 Snoqualmie R nr Carnation	A	24.9	3	9	9	15	8	5	3	1	8	N	Influenced by Tolt R. Not representative of lower Snoqualmie.	
07D130 C	WA-07-1100 Snoqualmie R @ Snoqualmie	A	19.5	3	5	8	5	15	9	5	11	1	6	Y	
07C070 C	WA-07-1160 Skykomish R @ Monroe	A	13.9	3	10	7	6	12	8	4	7	2	6	N	
07C120 C	WA-07-1200 Skykomish R nr Gold Bar	AA	8.4	3	7	8	8	7	7	2	8	1	5	N	
08E110 C	WA-08-1018 Upper Kelsey Cr	AA	4.6	3	12	8	10	**	26	4	6	4	24	Y	Urban runoff.
08H070 C	WA-08-1020 Thornton Cr nr Mouth	AA	5.7	3	9	9	4	**	26	2	3	4	26	N	Urban runoff.
09A070 C	WA-08-1030 McAleen Cr nr Mouth	AA	6.1	3	9	8	7	**	26	7	8	8	26	Y	Originate in shallow lake. Septic tank seepage. Turf farm runoff. Urban runoff.
09B070 C	WA-08-1070 Sammamish R @ Bothell	AA	3.8	3	20	18	7	46	27	4	9	3	35	Y	Originate in shallow lake. Septic tank seepage. Turf farm runoff. Urban runoff.
09K071 C	WA-08-1095 Bear Cr. below Cottage Lake Cr	AA	3	11	9	2	**	25	3	7	4	25	Y	Urban runoff.	
09B110 C	WA-08-1100 Sammamish R @ Redmond	AA	1.7	3	25	12	23	**	7	2	3	6	25	Y	Urban runoff.
09B130 C	WA-08-1110 Issaquah Cr nr Issaquah	A	21.7	3	6	7	6	**	16	5	4	4	16	Y	Urban runoff.
09F070 C	WA-08-1130 May Cr nr Mouth	AA	6.1	3	7	8	6	**	18	4	2	1	18	Y	Urban runoff.
09G070 C	WA-08-1140 Cedar R @ Logan St/Renton	A	19.5	3	9	6	7	22	12	3	13	3	10	Y	Urban runoff.
09C110 C	WA-08-1150 Cedar R nr Landsburg	AA	16.1	3	2	6	4	6	7	1	3	1	3	N	Urban runoff.
09B070 C	WA-08-2100 Mercer Slough nr Bellevue	AA	0.0	3	11	20	3	**	25	9	5	3	25	N	Dredging. Saltwater influx. Urban runoff. Combined sewer overflows. Organic tox may be a problem in sediments.
P9B009 C	WA-08-9340 Ship Canal @ Montlake Bridge	L	3	26	16	9	**	4	2	2	2	26	Y	Urban runoff. Combined sewer overflows. Organic tox may be a problem in sediments.	
ELB005 C	WA-09-0010 Elliott Bay near Harbor Island	B	6.3	2	14	29	13	6	**	1	**	**	18	Y	Urban runoff. Combined sewer overflows. Organic tox may be a problem in sediments.
ELB010 C	WA-09-0010 Duwamish Waterway @ 16th St Br	B	11.0	2	19	24	18	35	**	5	**	**	35	Y	Naturally low oxygen. Renton STP (recently corrected). Combined sewer overflows. Organic tox may be a problem in sediments.
09A060 C	WA-09-1010 Duwamish R @ Allentown Br	B	11.0	3	19	19	4	37	31	4	8	8	32	Y	Nat. low oxygen. Renton STP (recently corrected). Combined sewer overflows. Organic tox in sediments? Urban & Indust. runoff.
09E070 C	WA-09-1015 Mill Creek @ Grillie	A	9.0	3	20	86	8	55	50	22	9	21	93	Y	Urban and Industrial runoff. Dairy waste.
09E090 C	WA-09-1015 Mill Creek - Kent on W Valley	A	9.0	3	19	61	8	60	45	18	13	19	91	Y	Urban and Industrial runoff. Dairy waste.
09B071 C	WA-09-1015 Springbrook Cr. @ N. end Longa	A	3	16	70	9	**	43	22	11	14	70	Y	Urban and Industrial runoff.	
09A090 C	WA-09-1020 Green R @ 212th St nr Kent	A	31.3	3	17	14	6	24	19	3	7	6	17	Y	Cattle (dairy, etc.). Urban runoff. Dairy waste.
09F071 C	WA-09-1028 Neukum Cr nr Mouth	A	3	7	8	7	**	33	4	4	10	33	Y	Urban runoff. Combined sewer. Agr.	
09A190 C	WA-09-1030 Green R @ Kanasket	AA	22.2	3	7	7	10	7	5	8	2	6	N	Urban runoff.	
CHB003 C	WA-10-0010 Commencement Bay	A	9.8	3	9	31	7	**	1	**	**	16	Y	Urban runoff. Combined sewer. Agr.	

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Station Number	WSTS Number	Station Name	Seg. Yrs	Seg. Size in Class (mi)	Size in Areal Temp Oxy	pH	Bact Nutr Turb Sed	Susp Amto	Over all	In 1988	Comments and Possible Sources of WQI's Greater Than 20
runoff. Tacoma STP (recently corrected). Organic tox may be problem in sed. Puyallup R.											
CHB006 C	WA-10-0020	Commencement Bay nth City Wh	B	2.6	2	16	31	9	11	** 2	** 21
CHB010 C	WA-10-0020	Commencement-Puyallup R Mouth	B	2.6	2	13	29	8	9	** 2	** 17
10A050 C	WA-10-1020	Puyallup R & Puyallup (USGS)	A	9.4	3	8	31	6	33	16	22
10A070 C	WA-10-1020	Puyallup R & Meridian St	A	9.4	3	8	7	7	32	16	25
10C070 C	WA-10-1030	White R & Sumner	A	29.6	3	12	8	4	29	13	18
10A10 C	WA-10-1060	Puyallup R & Orting	A	16.0	3	2	5	3	10	13	25
11A070 C	WA-11-1010	Misqually R & Nisqually	A	19.1	3	11	7	8	11	14	18
11A090 C	WA-11-1020	Misqually R abv Powell Cr	A	25.1	3	6	7	5	8	11	21
11A140 H	WA-11-1030	Misqually R & Elbe	AA	27.0	1	2	7	9	9	11	20
12A070 C	WA-12-1110	Chambers Cr nr Steilacoom	A	0.0	3	11	9	4	19	25	5
BUD005 C	WA-13-0020	Budd Inlet-Oly Shori at Horn	A	3.8	3	13	17	14	5	** 1	** 9
BUD002 C	WA-13-0030	Budd Inlet S End Oly Port Dock	B	1.1	3	14	25	8	15	** 2	** 17
13A060 C	WA-13-1010	Deschutes R & St Bridge	A	18.3	3	18	6	10	13	13	5
13A150 C	WA-13-1020	Deschutes R nr Rainier	A	23.3	3	10	8	10	14	12	4
PCK001 C	WA-14-0010	Pickering Psg nr Harstene Is.	A	14.2	2	12	28	9	4	** 1	** 15
ELD0001 C	WA-14-0020	Eld Inlet near Flapjack Point	A	6.2	3	12	25	13	2	** 1	** 12
ELD0002 C	WA-14-0020	Eld Inlet & Young Cove	A	0.0	1	13	** 1	** 1	** 22	2	** 10
TOT001 C	WA-14-0030	Totten Inlet near Windy Point	A	9.5	3	15	30	16	3	** 1	** 16
DAK004 C	WA-14-0040	Oakland Bay nr Eagle Point	A	4.7	3	17	30	14	8	** 3	** 17

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 Note: indicates insufficient data, 'C' and 'H' by station number indicate data is current (last three years) or historical (last eight years), respectively.

Station WATS Number	Station Name	Seg. Yrs	Seg. Size in Class (mi)	Anal Temp Oxy	pH	Bact Nutr Turb Sed	Susp Amo Over all	Vol. in 1988	Comments and Possible Sources of 100's Greater than 20
23A070 C WA-23-1010 Chehalis R @ Porter	A	32.5	3	22	12	3	19	23	4 Low flows. Cattle (dairy). STP's. Black River aquaculture.
23A120 C WA-23-1020 Chehalis R @ Centralia	A	9.4	3	29	28	7	16	23	5 Low flows. Cattle (dairy). Horse ranching. STP's.
23A160 C WA-23-1100 Chehalis R @ Dryden	A	31.5	3	22	8	8	17	9	2 Low flows. Slack water condition.
WPA003 C WA-24-0020 Willapa River @ Johnson Slough	A	96.4	3	20	28	17	4	** 7	** 16 Raw sewage. Raymond and South Bend STP's (recently corrected). Inadequate septic systems. Raw sewage. Low flows. Shallow.
WPA004 C WA-24-0020 Willapa Bay at Toke Point	A	0.0	3	12	29	19	2	** 2	** 16 Agriculture. Naturally low oxygen. Upwelling.
WPA001 C WA-24-0020 Willapa River at Raymond	A	11.8	3	23	21	9	8	** 10	** 15 Raymond and South Bend STP's (recently corrected). Inadequate septic systems. Raw sewage. Low flows. Agriculture.
24B090 C WA-24-2020 Willapa R nr Willapa	A	11.8	3	24	9	5	33	13	2 Raw sewage. Raw sewage. Agr. runoff. Low flow.
24B130 C WA-24-2020 Willapa R @ Lebam	A	23.2	3	13	10	5	59	17	3 Septic tank seepage. Raw sewage. Agr. runoff. Low flow.
24B070 C WA-26-1010 Cowlitz R @ Kelso	A	18.7	3	8	7	6	12	17	18 Cattle (dairy).
26C070 C WA-26-1020 Cowlman R @ Kelso	A	18.4	3	23	16	3	21	10	4 Glacial fed. Volcanic and dredging activities.
26D070 C WA-26-1050 Toutle R nr Castle Rock	A	17.2	3	28	8	6	9	18	25 Little bank veg. Low flows. Shallow, bedrock substrate.
26E070 H WA-26-1110 Cispus R nr Kosmos	AA	19.9	1	1	6	3	7	5	9 Volcanic and dredging activities. Little bank veg. Low flows (7).
26B190 H WA-26-1120 Cowlitz R nr Randle	AA	44.2	?	9	8	7	10	8	9 Glacial fed.
27B070 C WA-27-1010 Kalana R nr Kalana	AA	10.4	3	13	7	8	11	9	2 Glacial fed.
27D090 C WA-27-2020 EF Lewis R nr Dorian Corner	AA	24.6	3	24	6	6	13	7	2 Glacial fed.
27C110 H WA-27-2040 Lewis R @ Ariel (USGS)	AA	16.0	7	6	8	8	5	9	3 Glacial fed.
29C070 H WA-29-1010 Wind R nr Carson	A	2.3	2	9	6	3	12	6	11 Glacial fed.
29B070 H WA-29-3010 White Salmon R nr Underwood	A	31.2	2	6	2	2	19	9	3 Glacial fed.
30B070 H WA-30-1010 Klickitat R nr Pitt (USGS)	A	19.8	?	10	8	7	8	14	5 Glacial fed tributary.
32A070 C WA-32-1010 Walla Walla R nr Touchet	A	21.6	3	45	6	29	34	19	43 Agr. runoff. Little bank veg. Low summer flows.
32B070 C WA-32-1020 Touchet R @ Touchet	A	54.8	3	42	6	29	24	23	28 Agr. runoff. Little bank veg. Low summer flows.
33A050 C WA-33-1010 Snake R @ Burbank	A	70.3	3	32	14	11	5	15	8 Summer slack water condition.
34A070 C WA-34-1010 Palouse R @ Hooper	B	89.6	3	26	14	26	23	45	46 Agr. runoff. Cattle (feedlot). Low summer flows. Irrig. returns. Little bank veg.

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Station Number	WBTS	Station Name	Seg. Yrs	Seg. Size in Class (mi)	Areal Temp	Oxy	pH	Susp	Bact	Nutr	Turb	sed	Tox	Over all	In 1988	Comments and Possible Sources of WBTS Greater Than 20
34610 C WA-34-1020	SF Palouse R & Pullman	A	23.3	3	19	7	19	76	100	25	21	23	100	Y	Moscow, ID STP. Agr. runoff. Little bank veg.	
35B060 C WA-35-2010	Tucannon R & Powers	A	32.7	3	15	10	7	25	22	21	28	4	22	Y	Agr. runoff. Cattle (open range).	
37A090 C WA-37-1010	Yakima R & Kiona	A	80.4	3	38	10	17	18	37	9	21	18	46	Y	Irrigation returns. Misc STPs.	
37A190 C WA-37-1040	Yakima R & Parker	A	12.5	3	13	8	6	20	22	4	17	7	12	Y	Agr. runoff/irrigation returns. Feedlots.	
37B200 C WA-37-1040	Yakima R abv Altenum Cr (USGS)	A	12.5	3	17	11	10	24	25	15	21	14	33	Y	Yakima STP. Silviculture.	
38A061 H WA-38-1010	Naches River @ Nelson Bridge	A	?	10	11	4	***	9	5	8	5	13	N			
39A051 H WA-39-1010	Yakima River @ Union	A	5	12	11	3	***	14	8	14	4	17	Y			
39A041 H WA-39-1010	Yakima River below Roza Dam	A	1	18	11	5	***	20	17	43	3	43	Y			
39E071 C WA-39-1110	Cabin Creek nr Easton	AA	3	8	9	6	***	7	6	13	1	14	N			
41A070 C WA-41-1010	Crab Cr nr Beverly	B	45.8	3	34	9	25	21	36	15	40	20	61	N	Agr. runoff/irrigation return.	
41A101 C WA-41-1010	Crab Creek @ McPherson Road	B	3	31	13	14	15	19	5	11	21	31	N	Agr. runoff/irrigation return.		
41A110 H WA-41-1030	Crab Cr nr Moses Lake	B	17.9	2	24	5	16	28	14	25	12	20	22	N	Agr runoff/irrigation return.	
41B071 C WA-41-1110	Winchester Wasteway @ Gage	A	3	37	13	9	17	17	5	10	21	37	N	Agr. runoff/irrigation return.		
41C071 C WA-41-1120	Frenchman Hills Wasteway @ Gag	A	3	26	9	12	23	45	6	25	22	45	N	Agr. runoff/irrigation return.		
45A070 C WA-45-1010	Wenatchee R @ Wenatchee	A	27.1	3	19	6	27	8	7	4	8	16	19	N	Irrigation returns. Silviculture.	
45A110 C WA-45-1020	Wenatchee R nr Leavenworth	AA	27.1	3	11	9	12	3	4	1	3	1	4	N		
46A070 C WA-46-1010	Entiat R nr Entiat	A	20.5	3	17	8	20	5	6	2	11	13	12	N		
47A070 C WA-47-9020	Chelan R @ Chelan	L	33104	3	31	10	10	3	4	1	1	7	16	N	Elevated surface temp in lake. Vol due to hist. pesticides.	
48A070 C WA-48-1010	Methow R nr Pateros	A	35.2	3	16	8	17	9	8	4	8	9	8	N		
48A130 C WA-48-1020	Methow R nr Twisp	A	5.0	3	7	7	16	7	4	1	6	7	7	N		
48C070 C WA-48-1058	Andrews Cr nr Hazama (USGS)	AA	0.0	3	0	8	3	1	7	0	3	1	3	N		
49A070 C WA-49-1010	Okanogan R @ Malott	A	25.7	3	27	19	14	15	7	13	15	11	19	Y	Little bank vegetation, wide shallow channel.	
49A090 C WA-49-1020	Okanogan R @ Okanogan	A	48.4	2	30	18	14	15	4	2	15	9	19	Y	Little bank vegetation, wide shallow channel.	
49B070 C WA-49-1030	Similkameen R @ Oroville	A	27.1	3	22	12	21	10	3	5	12	9	12	N	Upstream mining activity.	
49A190 C WA-49-1040	Okanogan R @ Oroville	A	4.9	3	31	16	24	8	6	2	12	18	26	Y	Little bank vegetation, wide shallow channel. Influenced by Lake Osoyoos temperature.	
51A070 C WA-51-1010	Nespelem R @ Nespelem	A	18.0	3	6	8	10	20	12	1	3	4	9	N		

Table 1. 1990 Water Segment Analysis Using the Water Quality Index. Sorted by Water Body Tracking Systems (WSTS) number.
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Station Number	WSTS Number	Station Name	Seg. Class	Yrs in	Susp Ammonium	Over all	Comments and Possible Sources								
			(mi)	Anal Temp Oxy	pH	Bect Nutr Turb Sed	Tox								
52A070 C	WA-52-1010	Spokane R @ Keller	A	64.4	3	14	8	15	9	7	2	4	8	8	N
52A070 H	WA-54-1010	Spokane R @ Long Lake (USGS)	A	33.9	4	20	17	5	6	15	13	6	14	11	N
52A120 C	WA-54-1020	Spokane R @ Riverside State Pk	A	17.4	3	17	8	16	24	24	17	13	24	18	Y
55B070 C	WA-55-1010	Little Spokane R nr Mouth	A	48.6	3	10	11	13	12	12	11	12	7	10	Y
56A070 C	WA-56-1010	Hargman Cr @ Mouth	A	57.4	3	31	5	27	20	31	40	26	26	41	Y
57A190 C	WA-57-1010	Spokane R nr Post Falls	A	24.1	3	31	17	7	5	4	1	2	2	16	Y
59A070 C	WA-59-1010	Colville R @ Kettle Falls	A	52.9	3	21	13	15	20	21	11	11	15	18	Y
60A070 C	WA-60-1010	Kettle R nr Barstow	A	32.9	3	21	10	13	8	3	3	6	7	10	N
62A080 H	WA-62-1010	Pend Oreille R @ Border (USES)	A	18.5	4	23	14	17	3	8	2	5	21	20	N
62A150 C	WA-62-1020	Pend Oreille R @ Newport	A	53.2	3	24	13	13	3	3	2	3	8	13	N
2BA165 C	WA-CR-1010	Columbia R @ Warrendale	A	146.1	3	29	17	7	5	10	5	17	10	20	Y
36A065 C	WA-CR-1030	Columbia R @ Richland	A	61.9	3	15	9	12	6	9	3	24	9	24	N
36A070 C	WA-CR-1030	Columbia R nr Vernita	A	61.9	3	21	11	13	3	7	2	7	8	11	N
44A070 C	WA-CR-1040	Columbia R blw Rock Is Dam	A	148.0	3	26	9	19	16	9	2	5	13	22	N
53A070 C	WA-CR-1050	Columbia R @ Grand Coulee	A	51.5	3	20	14	9	1	8	1	1	5	6	N
61A070 H	WA-CR-9010	Columbia R @ Northport (USGS)	AA	0.0	4	12	8	9	8	9	1	6	16	8	N
SKG001 C	WA-PS-0010	Skagit Bay at Hope Island	A	60.4	2	7	25	13	5	see	1	see	see	12	Y
SUZ001 C	WA-PS-0020	Port Susan at Kayak Point	A	42.8	2	16	46	16	19	see	1	see	see	46	Y
PS0019 C	WA-PS-0030	Possession Snd off E Gedney Is	A	50.0	3	7	33	9	7	see	1	see	see	18	N
PSB003 C	WA-PS-0050	Puget Sound at West Point	AA	126.6	3	8	27	9	5	see	1	see	see	14	N
ADM003 C	WA-PS-0060	Admiralty Inlet S. of Useless	AA	0.0	1	5	4	8	1	see	1	see	see	4	N
EAP001 C	WA-PS-0080	East Passage Sh of Three Tree	AA	0.0	1	7	10	6	see	1	see	see	5	N	
MRR001 C	WA-PS-0090	Tacoma Narrows nr Pt Defiance	AA	108.7	3	8	26	6	1	see	1	see	see	13	N
NS0002 H	WA-PS-0080	Nisqually Reach @ Nisqually R.	AA	52.1	3	10	28	10	5	see	1	see	see	15	N
CSE001 C	WA-PS-0090	Case Inlet off S. Heron Is	AA	0.0	1	8	10	4	0	see	1	see	see	5	N
DNA001 C	WA-PS-0090	Dana Passage near Brisco Point	AA	31.5	3	12	24	12	0	see	1	see	see	14	N
HCB006 C	WA-PS-0100	Hood Canal near King Spit	AA	42.4	3	8	31	8	0	see	1	see	see	4	N
HCB003 C	WA-PS-0110	Hood Canal at Eldon	AA	78.1	3	7	54	10	1	see	1	see	see	17	N
HCB004 C	WA-PS-0110	Hood Canal at Sisters Point	AA	78.1	2	11	64	9	1	see	1	see	see	40	N

Table 1. 1990 Water Segment Analysis Using the Water Quality Index. Sorted by Water Body Tracking Systems (WSTS) number. 'I' indicates insufficient data, 'C' and 'H' by station number indicate data is current (last three years) or historical (last eight years), respectively.

Station Number	WBTS Number	Station Name	Seg. Yrs	Seg. in Class (m)	Areal	Temp	Oxy	pH	Sect	Nutr	Turb	Sed	Tox	all	Over all	in 1988	Comments and Possible Sources	WBTS
ADM001 C	WA-PS-0120	Admiralty Inlet S Whidbey Is	AA	136.5	2	5	26	8	0	stat	1	***	***	***	***	14	N	
ADM002 C	WA-PS-0130	Admiralty Inlet NW of Pt Wilson	AA	0.0	1	3	2	4	0	***	1	***	***	***	***	2	N	

Table 2. 1990 Water Segment Analysis Using the Water Quality Index. Sorted by Department of Ecology Region and station number. 'N/A' indicates insufficient data, 'C' and 'H' by station number indicate data is current (last three years) or historical (last eight years), respectively.

Station Number	Station Name	Seg. Size in Class (mi)	Seg. Yrs in Anal Temp Ory	PH	Bact Nutr Turb Sed	Susp Amm0	Over 1988	in Comments and Possible Sources of WQL Greater Than 20						
ECOLOGY REGION: -C-														
30B070 H	WA-30-1010 Klickitat R nr Pitt (USGS)	A	19.8	2	10	8	8	14	5	11	14	15	N	Glacial fed tributary.
37A090 C	WA-37-1010 Yakima R @ Kiona	A	60.4	3	38	10	17	18	37	9	21	18	46	Irrigation returns. Misc STPs. Silviculture.
37A190 C	WA-37-1040 Yakima R @ Parker	A	12.5	3	13	8	6	20	22	4	17	7	12	Y
37A200 C	WA-37-1040 Yakima R abv Ahtanum Cr (USGS)	A	12.5	3	17	11	10	24	25	15	21	14	33	Y
38A061 H	WA-38-1010 Neches River @ Nelson Bridge	A	?	10	11	4	**	9	5	8	5	13	N	
39A041 H	WA-39-1010 Yakima River below Roza Dam	A	1	18	11	5	**	20	17	43	3	43	Y	
39A051 N	WA-39-1010 Yakima River @ Umtanum	A	5	12	11	3	**	14	8	14	4	17	Y	
39E071 C	WA-39-1110 Cabin Creek nr Easton	AA	3	8	9	6	**	7	6	13	1	14	N	
44A070 C	WA-CR-1040 Columbia R blw Rock Is Dam	A	148.0	3	26	9	19	16	9	2	5	13	22	N
45A070 C	WA-45-1010 Wenatchee R @ Wenatchee	A	27.1	3	19	6	27	8	7	4	8	16	19	N
45A110 C	WA-45-1020 Wenatchee R nr Leavenworth	AA	27.1	3	11	9	12	3	4	1	3	1	4	N
46A070 C	WA-46-1010 Entiat R nr Entiat	A	20.5	3	17	8	20	5	6	2	11	13	12	N
47A070 C	WA-47-9020 Chelan R @ Chelan	L	33104	3	31	10	10	3	4	1	1	7	16	N
48A070 C	WA-48-1010 Methow R nr Pateros	A	35.2	3	16	8	17	9	8	4	8	9	8	N
48A130 C	WA-48-1020 Methow R nr Twisp	A	5.0	3	7	7	16	7	4	1	6	7	7	N
48C070 C	WA-48-1058 Andrews Cr nr Mazama (USGS)	AA	0.0	3	0	8	3	1	7	0	3	1	3	N
49A070 C	WA-49-1010 Okanogan R @ Malott	A	25.7	3	27	19	14	15	7	13	15	11	19	Y
49A090 C	WA-49-1020 Okanogan R @ Okanogan	A	48.4	2	30	18	14	15	4	2	15	9	19	Y
49A190 C	WA-49-1040 Okanogan R @ Oroville	A	4.9	3	31	16	24	8	6	2	12	18	26	Y
49B070 C	WA-49-1030 Similkameen R @ Oroville	A	27.1	3	22	12	21	10	3	5	12	9	12	N
51A070 C	WA-51-1010 Nespelem R @ Nespelem	A	18.0	3	6	8	10	20	12	1	3	4	9	N
53A070 C	WA-CR-1050 Columbia R @ Grand Coulee	A	51.5	3	20	14	9	1	8	1	1	5	8	N
ECOLOGY REGION: -E-														
32A070 C	WA-32-1010 Walla Walla R nr Touchet	A	21.6	3	45	6	29	29	34	19	43	20	47	Y

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Station Number	WBTS	Station Name	Seg. in Class (mi)	Seg. Size in mi	Seg. Yrs	Susp Amo	Over all	Comments and Possible sources of WQIs greater than 20
32A070 C	WA-32-1020	Touchet R @ Touchet	A	54.8	3	42	6	29 24 23 28 43 19 39 Y Little bank veg. Low summer flows. Agr. runoff.
33A050 C	WA-33-1010 S	Snake R @ Burbank	A	70.3	3	32	14	11 5 15 8 9 13 20 N Summer slack water condition.
34A070 C	WA-34-1010	Palouse R @ Hooper	B	69.6	3	26	14	26 23 45 46 59 23 62 Y Low summer flows. Irrig. return. Little bank veg. Agr. runoff. Cattle (feedlot). Dryland agr. Misc STP's.
34B110 C	WA-34-1020	SF Palouse R @ Pullman	A	23.3	3	19	7	19 76 100 25 21 23 100 Y Moscow, ID STP. Agr. runoff. Little bank veg.
35B060 C	WA-35-2010	Tucannon R @ Powers	A	32.7	3	15	10	7 25 22 21 28 4 22 Y Agr. runoff. Cattle (open range).
36A065 C	WA-CR-1030	Columbia R @ Richland	A	61.9	3	15	9	12 6 9 3 26 9 24 N
36A070 C	WA-CR-1030	Columbia R @ Vernita	A	61.9	3	21	11	13 3 7 2 7 8 11 N Upstream impoundment.
41A070 C	WA-41-1010	Crab Cr @ Beverly	B	45.8	3	34	9	25 21 34 15 40 20 61 N Agr. runoff/Irrigation return.
41A101 C	WA-41-1010	Crab Creek @ McPherson Road	B	3	31	13	14	15 19 5 11 21 31 N Agr. runoff/Irrigation return.
41A110 H	WA-41-1030	Crab Cr @ Roses Lake	B	17.9	2	24	5	16 28 14 25 12 20 22 N Agr runoff/Irrigation return.
41B071 C	WA-41-1110	Winchester Wasteway @ Gage	A	3	37	13	9	17 17 5 10 21 37 N Agr. runoff/Irrigation return.
41C071 C	WA-41-1120	Frenchman Hills Wasteway @ Gag	A	3	26	9	12	23 45 6 25 22 45 N Agr. runoff/Irrigation return.
52A070 C	WA-52-1010	Sanpoil R @ Keller	A	64.4	3	14	8	15 9 7 2 4 6 8 N
54A070 H	WA-54-1010	Spokane R @ Long Lake (USGS)	A	33.9	4	20	17	5 6 15 13 6 14 11 N
54A120 C	WA-54-1020	Spokane R @ Riverside State Pk	A	17.4	3	17	8	16 24 24 17 13 24 18 Y Urban runoff. Spokane STP.
55B070 C	WA-55-1010	Little Spokane R @ Mouth	A	48.6	3	10	11	13 12 12 11 12 7 10 Y
56A070 C	WA-56-1010	Hanahan Cr @ Mouth	A	57.4	3	31	5	27 20 31 40 26 26 41 Y Low summer flows. Agr. runoff. Urban runoff.
57A190 C	WA-57-1010	Spokane R @ Post Falls	A	26.1	3	31	17	7 5 4 1 2 2 16 Y Low summer flows. Nutrient load from Lake Coeur d'Alene, Post Falls STP.
59A070 C	WA-59-1010	Colville R @ Kettle Falls	A	52.9	3	21	13	15 20 21 11 11 15 18 Y Silviculture. Upstream impoundment.
60A070 C	WA-60-1010	Kettle R @ Baraton	A	32.9	3	21	10	13 8 3 3 6 7 10 N
61A070 H	WA-CR-9010	Columbia R @ Northport (USGS)	AA	0.0	4	12	8	9 8 9 1 6 16 8 N
62A080 H	WA-62-1010	Pend Oreille R @ Border (USGS)	A	18.5	4	23	14	17 3 8 2 5 21 20 N
62A150 C	WA-62-1020	Pend Oreille R @ Newport	A	53.2	3	24	13	13 3 3 2 3 8 13 N
ECOLOGY REGION: -N-								
01A050 C	WA-01-1010	Nooksack R @ Brennen	A	28.2	3	11	7	4 15 15 24 3 25 Y Nonpoint agr. runoff, dairy wastes, forest practices. Glacial fed.
01A120 C	WA-01-1020	Nooksack R @ No Cedarville	A	8.4	3	5	6	3 12 12 16 22 1 11 N Forest practices. Glacial fed.
01D070 C	WA-01-2010	Sunes R @ Huntingdon BC	A	11.0	3	13	18	4 50 39 7 5 9 40 Y Agr. runoff. Asteros from natural slides.

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Station Number	WBTS	Station Name	Seg. Yrs	Seg. Size in Miles	Class (mi)	Anal Temp Dry	pH	Bact Nutr Sed	Susp Amo Tax	Over all	in 1988	Comments and Possible Sources	
03A060 C	WA-03-1010	Skagit R nr Mount Vernon	A	25.6	3	5	5	12	8	7	21	1	N
03B050 C	WA-03-2010	Samish R nr Burlington	A	31.1	3	5	8	6	35	12	9	3	19
04A060 C	WA-04-1010	Skagit R @ Concrete	AA	10.9	3	4	6	4	5	6	14	1	Y
04A100 C	WA-04-1090	Skagit R @ Marblemount	AA	10.9	3	1	6	5	5	4	2	5	N
04B070 C	WA-04-1020	Baker R @ Concrete	AA	1.2	3	7	8	5	2	6	3	1	3
04C070 C	WA-04-1060	Seuk R nr Rockport	AA	13.2	3	2	6	4	11	8	13	25	1
05A070 C	WA-05-1010	Stillaguamish R nr Sylvana	A	17.8	3	11	10	9	22	12	9	14	3
05A090 C	WA-05-1040	SF Stillaguamish @ Arlington	A	15.9	3	8	9	5	22	10	7	16	1
05B070 C	WA-05-1020	NF Stillaguamish @ Cicero	A	31.2	3	6	8	4	20	12	14	18	1
07A090 C	WA-07-1020	Snohomish R @ Snohomish	A	5.3	3	12	8	12	24	12	6	11	1
07A111 H	WA-07-1050	Snohomish R @ Monroe (USGS)	A	7.1	4	10	10	19	25	13	7	9	3
07B055 C	WA-07-1030	Pilchuck R @ Snohomish	A	26.8	3	17	7	7	23	12	8	19	2
07C070 C	WA-07-1160	Skykomish R @ Monroe	A	13.9	3	10	7	6	12	8	4	7	2
07C120 C	WA-07-1200	Skykomish R nr Gold Bar	AA	8.4	3	7	8	8	7	7	2	6	W
07D070 C	WA-07-1080	Shoqualumie R nr Carnation	A	24.9	3	9	8	9	15	8	5	8	1
07D130 C	WA-07-1100	Shoqualumie R @ Snoqualmie	A	19.5	3	5	8	5	15	9	5	11	1
08A070 C	WA-08-1030	McAleer Cr nr Mouth	AA	6.1	3	9	8	7	26	7	8	8	26
08B070 C	WA-08-1070	Sammamish R @ Bothell	AA	3.8	3	20	18	7	46	24	4	9	3
08B110 C	WA-08-1100	Sammamish R @ Redmond	AA	1.7	3	25	12	23	**	7	2	3	6
08B130 C	WA-08-1110	Issaquah Cr nr Issaquah	AA	21.7	3	8	7	4	**	16	5	4	16
08C070 C	WA-08-1140	Cedar R @ Logan St/Kenton	A	19.5	3	9	6	7	22	12	3	13	3
08C110 C	WA-08-1150	Cedar R nr Landsburg	AA	16.1	3	2	6	4	6	7	1	3	1
08B070 C	WA-08-2100	Mercer Slough nr Bellevue	AA	0.0	3	11	20	3	**	25	9	5	3
08E110 C	WA-08-1018	Upper Kelsey Cr	AA	4.6	3	12	8	10	**	24	4	6	4
08F070 C	WA-08-1130	May Cr nr Mouth	AA	8.1	3	7	8	6	**	18	4	2	18
08H070 C	WA-08-1020	Thornton Cr nr Mouth	AA	5.7	3	9	9	4	**	26	2	3	4
08K071 C	WA-08-1075	Bear Cr. below Cottage Lake Cr	AA	3	11	9	2	**	25	3	7	4	25
09A060 C	WA-09-1010	Duxenish R @ Allentown Br	B	11.0	3	19	19	4	37	31	4	8	8
09A090 C	WA-09-1020	Green R @ 212th St nr Kent	A	31.3	3	17	14	6	24	19	3	7	6
09A190 C	WA-09-1030	Green R @ Kenastat	AA	22.2	3	7	7	7	10	7	5	8	2
09E070 C	WA-09-1015	Hill Creek @ Orville	A	9.0	3	20	86	8	55	50	22	9	21
09E090 C	WA-09-1010	Duxenish R @ Allentown Br	B	11.0	3	19	19	4	37	31	4	8	8

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Station Number	WATIS Number	Station Name	Seg. Yrs	Seg. Size in Class (mi)	Anal Temp Oxy	pH	Bact Nutr Turb	Sed Tox	Surf Atmo Over all	Comments and Possible Sources					
09E090 C	WA-09-1015	Hill Creek - Kent on W Valley A	9.0	3	19	61	8	60	45	18	13	19	91	Y	Urban and industrial runoff. Dairy waste.
09F071 C	WA-09-1028	Newakum Cr nr Mouth	A	3	7	8	7	***	33	4	10	33	Y	Dairy waste.	
09G071 C	WA-09-1015	Springbrook Cr. @ N. end Longa A	A	3	16	70	9	***	43	22	11	14	70	Y	Urban and industrial runoff.
ADM001 C	WA-PS-0120	Admiralty Inlet S Whidbey Is	AA	136.5	2	5	26	8	0	***	1	***	see	14	N
ADM002 C	WA-PS-0130	Admiralty Inlet NW of Pt Wilcox AA	0.0	1	3	2	4	0	***	1	***	see	see	2	
BLI006 C	WA-01-0050	Bellingham Bay @ Nun Buoy #4 B	3.6	2	12	26	17	14	***	4	***	see	15	Y	Georgia Pacific Corp. pulp mill. Urban runoff.
BLI008 C	WA-01-0040	Bellingham Bay at Post Point A	63.5	2	6	24	18	3	***	1	***	see	see	14	
BLI009 C	WA-01-0040	Bellingham Bay nr Pt. Frances A	63.5	3	9	16	12	0	***	1	***	see	7	N	
DRA001 C	WA-01-0020	Drayton Hbr Entrance Channel A	4.2	2	11	20	15	22	***	1	***	see	19	N	
DYE003 C	WA-15-0050	Dyes Inlet at Wash. Narrows A	7.7	2	15	22	6	1	***	1	***	see	13	N	
EAP001 C	WA-PS-0050	East Passage SW of Three Tree AA	0.0	1	7	10	6	***	1	***	see	see	5		
ELB005 C	WA-09-0010	Elliott Bay near Harbor Island B	6.3	2	14	29	13	6	***	1	***	see	18	Y	
EL-8010 C	WA-09-0010	Duwanish Waterway @ 16th St Br B	11.0	2	19	24	18	35	***	5	***	see	35	Y	
GRG002 C	WA-02-0010	Str. of Georgia W. of Patros AA	0.0	1	7	2	6	1	***	1	***	see	3	N	
HCB002 C	WA-17-0010	Hood Canal at Pulaali Point AA	27.4	2	15	54	13	0	***	1	***	see	33	N	
HCB006 C	WA-PS-0100	Hood Canal near King Spit AA	42.4	3	8	31	6	0	***	1	***	see	17	N	
HLM001 C	WA-05-0030	Holmes Harbor at Honeymoon Bay A	9.5	2	7	35	13	0	***	1	***	see	21	N	
HRO001 C	WA-02-0010	Haro Strait at Skipjack Island AA	425.0	2	5	27	6	4	***	1	***	see	13	N	
PNH001 C	WA-06-0020	Penn Cove near Penn Cove Park A	5.2	2	8	43	13	1	***	1	***	see	25	N	
P00005 C	WA-15-0030	Port Orchard at Brownsville MA	21.3	2	16	22	7	2	***	1	***	see	14	Y	
P00006 C	WA-15-0030	Liberty Bay at Virginia Point A	21.3	2	16	22	14	2	***	1	***	see	53	Y	
PSB003 C	WA-PS-0050	Puget Sound at West Point AA	126.6	3	8	27	9	5	***	1	***	see	18	Y	
PSB009 C	WA-08-9340	Ship Canal @ Montlake Bridge L	3	26	16	9	***	4	2	2	2	26	Y		
PSS008 C	WA-07-0010	Pt Gardner Bay at Pier 3 B	0.2	2	11	54	8	42	***	1	***	see	49	Y	
PSS015 C	WA-07-0010	Snohomish R at Highway 99 Brdg A	0.2	2	22	46	34	***	3	***	see	see	18	N	
PSS019 C	WA-PS-0030	Possession Snd off E Gedney Is A	50.0	3	7	33	9	7	***	1	***	see	49	Y	

Table 2: 1990 Water Segment Analysis Using the Water Quality Index. Sorted by Department of Ecology Region and station number.
 * indicates insufficient data, 'C' and 'H' by station number indicate data is current (last three years) or historical (last eight years), respectively.

Station Number	WBTS Number	Station Name	Seg. Yrs	Seg. Size in Class (mi)	Areal Temp Oxy	pH	Bact Nutr	Turb	Sed	Susp Amno	Over all	In 1988	Comments and Possible Sources	
PSS020 C	WA-07-0010	Ebay Slough near Marysville	A	0.2	2	14	43	31	13	***	6	***	34	Y Combined sewer overflows. Meyerhauser and Scott paper pulp mills. Urban runoff.
PTH005 C	WA-17-0020	Pt Townsend Nbr near Wallan Pnt	A	11.1	2	8	25	9	2	***	1	***	12	Y
SAR003 C	WA-06-0010	Saratoga Passage off East Pnt	A	66.6	3	6	25	9	0	***	1	***	12	N
SIN001 C	WA-15-0040	Sinclair Inlet at Naval Shipyrd	A	3.2	2	15	21	7	3	***	1	***	14	Y Urban and industrial runoff. Contaminated sediment?
SJ1001 C	WA-02-0010	San Juan Channel at Reid Rock	AA	425.0	2	6	25	7	7	***	1	***	12	N
SKD001 C	WA-PS-0010	Skegit Bay at Hope Island	A	60.4	2	7	25	13	5	***	1	***	12	Y Influenced by Skagit River.
SUZ001 C	WA-PS-0020	Port Susan at Kayak Point	A	42.8	2	16	46	16	19	***	1	***	46	Y Influenced by Stillaguamish River.
ECOLOGY REGION: -S-														
10A050 C	WA-10-1020	Puyallup R @ Puyallup (USGS)	A	9.4	3	8	31	6	33	16	22	25	2	35 Y Puyallup and Tacoma STP's (recently upgraded). White R. sources. Pulp mill (?). Sonoco.
10A070 C	WA-10-1020	Puyallup R @ Meridian St	A	9.4	3	8	7	7	32	16	25	4	27 Y Puyallup and Tacoma STP's (recently upgraded). White R. sources. Pulp mill (?). Sonoco.	
10A110 C	WA-10-1060	Puyallup R @ Orting	A	16.0	3	2	5	3	10	13	25	3	15 N Nonpoint agr. Cattle (dairy).	
10C070 C	WA-10-1030	White R @ Sumner	A	29.6	3	12	8	4	29	13	18	25	3	25 Y Glacial fed. Flushing from Puget Power settling basins.
11A070 C	WA-11-1010	Nisqually R @ Nisqually	A	19.1	3	11	7	8	11	14	18	17	5	11 N Glacial fed.
11A090 C	WA-11-1020	Nisqually R abv Powell Cr	A	25.1	3	6	7	5	8	11	21	15	3	10 N Glacial fed.
11A140 H	WA-11-1030	Nisqually R @ Elbe	AA	27.0	1	2	7	9	9	11	20	***	20 N Glacial fed.	
12A070 C	WA-12-1110	Chambers Cr nr Stellecom	A	0.0	3	11	9	4	19	25	5	5	5	16 N Septic tank seepage (sewered 1986). Fish hatchery.
13A060 C	WA-13-1010	Deschutes R @ E St Bridge	A	18.3	3	18	6	10	13	13	5	6	6	10 N
13A150 C	WA-13-1020	Deschutes R nr Rainier	A	23.3	3	10	8	10	14	12	4	3	4	7 N
14A070 C	WA-16-1010	Skokomish R nr Potlatch	AA	9.0	3	1	8	10	10	7	4	5	3	5 N
21A080 C	WA-21-1010	Quests R nr Clearwater (USGS)	AA	6.0	3	15	16	3	12	8	3	2	1	6 N Glacial fed.
21D070 H	WA-21-2030	NF Quinault R @ Amanda (USGS)	AA	14.5	4	1	6	10	5	12	1	25	9	15 N Lake outlet.
22A070 C	WA-22-1010	Humpalips R nr Humptulips	A	28.1	3	15	7	5	10	9	3	4	2	6 N
22C050 C	WA-22-4040	Chehalis R nr Montesano	A	20.3	3	19	12	5	34	15	5	9	2	19 Y Cattle (dairy). Misc small STP's. Septic tank seepage (?) Aquaculture.
22G070 C	WA-22-4050	Satsop R nr Satsop	A	6.4	3	10	7	4	14	11	5	8	2	6 N Silviculture
23A070 C	WA-23-1010	Chehalis R @ Porter	A	32.5	3	22	12	3	19	23	4	5	4	15 Y Low flows. Cattle (dairy). STP's. Black

Table 2. 1990 Water Segment Analysis Using the Water Quality Index. Sorted by Department of Ecology Region and station number. 'H' indicates insufficient data, 'C' and 'W' by station number indicate data is current (last three years) or historical (last eight years), respectively.

Station Number	WTS	Seg. Yrs	Seg. Size in Class (mi)	Anal Temp	Oxy	pH	Bact	Nutr	Turb	Sed	Tox	Over all	YOL	Comments and Possible Sources
23A120 C WA-23-1020	Chehalis R @ Centralia	A	9.4	3	29	28	7	16	23	5	5	14	27	Y Low flows. Cattle (dairy). Horse ranching. STP's.
23A160 C WA-23-1100	Chehalis R @ Dried	A	31.5	3	22	8	8	17	9	2	3	3	11	N Low flows. Slack water condition.
24B090 C WA-24-2020	Willapa R nr Willapa	A	11.8	3	24	9	5	33	13	2	4	6	24	Y Septic tank seepage. Raw sewage. Agr. runoff. Low flow.
24B130 C WA-24-2030	Willapa R @ Lebec	A	23.2	3	13	10	5	59	17	3	5	2	35	Y Cattle (dairy).
26B070 C WA-26-1010	Cowlitz R @ Kelso	A	18.7	3	8	7	6	12	17	18	23	2	14	N Glacial fed. Volcanic and dredging activities.
26B190 H WA-26-1120	Cowlitz R nr Randle	AA	46.2	7	9	8	7	10	8	9	** see 11	** see 11	N Glacial fed.	
26C070 C WA-26-1020	Cowman R @ Kelso	A	18.4	3	23	16	3	21	10	4	7	7	16	Y Little bank veg. Low flows. Shallow, bedrock substrate.
26D070 C WA-26-1050	Toutle R nr Castle Rock	A	17.2	3	28	8	6	9	18	25	25	5	21	Y Volcanic and dredging activities. Little bank veg. Low flows (?)
26E070 H WA-26-1110	Cispus R nr Kosmos	AA	19.9	1	1	6	3	7	5	9	9	3	5	N
27B070 C WA-27-1010	Kalama R nr Kalama	A	10.4	3	13	7	8	11	9	2	5	6	6	N
27C110 H WA-27-2040	Lewis R @ Ariel (USGS)	A	16.0	2	6	8	8	5	9	3	5	3	11	N
27D090 C WA-27-2020	EF Lewis R nr Dollar Corner	A	24.6	3	24	8	6	13	7	2	3	4	12	N
28A155 C WA-CR-1010	Columbia R @ Warrendale	A	146.1	3	29	17	7	5	10	5	17	10	20	Y Hanford. Surface sample not representative.
29B070 H WA-29-3010	White Salmon R nr Underwood	A	31.2	2	2	6	2	19	9	3	5	6	8	N
29C070 H WA-29-1010	Wind R nr Carson	A	2.3	2	9	6	3	12	6	11	6	3	7	N
ADM003 C WA-PS-0050	Admiralty Inlet S. of Useless	AA	0.0	1	5	4	6	1	** see 1	** see 1	** see 1	** see 1	4	N
BML001 C WA-15-0070	Burley-Minter Lagoon	AA	0.0	1	13	** see 13	3	** see 1	** see 1	** see 1	** see 1	** see 1	7	N
BUD002 C WA-13-0030	Budd Inlet S End Oly Port Dock	B	1.1	3	14	25	8	15	** see 2	** see 2	** see 2	** see 17	Y Urban runoff. Boaters. Wood waste (?)	
BUD005 C WA-13-0020	Budd Inlet-Oly Shoal at Horn	A	3.8	3	13	17	14	5	** see 1	** see 1	** see 1	** see 1	9	Y Misc STP's. LOTT STP. Deschutes River.
CMB003 C WA-10-0010	Commencement Bay	A	9.8	3	9	31	7	9	** see 1	** see 1	** see 1	** see 1	16	Y Boaters. Wood waste (?) Misc STP's. Developed shoreline.
CMB006 C WA-10-0020	Commencement Bay nth City Wt	B	2.6	2	16	31	9	11	** see 2	** see 2	** see 2	** see 21	Y Urban runoff. Combined sewer. Tacoma STP (recently corrected).	
CMB010 C WA-10-0020	Commencement-Puyallup R Mouth	B	2.6	2	13	29	8	9	** see 2	** see 2	** see 2	** see 17	Y Organic tox may be problem in sed. Puyallup R.	
														Urban runoff. Combined sewer. Tacoma STP (recently corrected). Organic tox may be problem in sed.

Table 2. 1990 Water Segment Analysis Using the Water Quality Index. Sorted by Department of Ecology Region and station number. 'C' and 'H' by station number indicate date is current (last three years) or historical (last eight years), respectively.

Station Number	WBTS	Seg. Yrs	Seg. in Class (mi)	Size in Anal Temp Oxy	pH	Bact Nutr Turb Sed	Susp Amo	Tox	Over all	In 1988	Comments and Possible Sources of WQI's Greater Than 20
CRR001 C WA-15-0060 Carr Inlet off Green Point AA 31.4 3 11 25 10 0 *** 1 *** *** 12 N problem in sed. Puyallup R.											
CSE001 C WA-PS-0090 Case Inlet off S. Heron Is AA 31.5 3 12 24 12 0 *** 1 *** *** 14 N Naturally low oxygen.											
DNA001 C WA-PS-0090 Dana Passage near Brisco Point AA 0.0 1 10 2 11 1 *** 1 *** *** 4 N Land development. Runoff.											
ELD001 C WA-14-0020 Eld Inlet near Flapjack Point A 6.2 3 12 25 13 2 *** 1 *** *** 12 X Naturally low oxygen.											
ELD002 C WA-14-0020 Eld Inlet @ Young Cove A 0.0 1 13 *** 22 2 *** 1 *** *** 10 Y Meyerhauser and ITT mills. Aberdeen and Hoquiam combined sewer overflows.											
GYS004 C WA-22-0030 Grays Hbr-Chehalis R & Std 011 B 20.6 3 18 26 6 16 *** 11 *** *** 15 Y Meyerhauser and ITT mills. Aberdeen and Hoquiam combined sewer overflows.											
GYS006 H WA-22-0030 Grays Hbr at E End Rennie Is. B 20.6 1 4 12 3 57 *** 10 *** *** 37 Y Hoquiam combined sewer overflows.											
GYS007 C WA-22-0030 Grays Hbr N Chnt nr Rayonier B 20.6 2 16 28 6 23 *** 9 *** *** 19 Y Hoquiam combined sewer overflows.											
GYS008 C WA-22-0030 Grays Hbr near Mid S. Channel B 20.6 3 16 31 10 13 *** 14 *** *** 18 Y Hoquiam combined sewer overflows.											
GYS009 C WA-22-0030 Grays Hrb @ Moon Is. Reach B 20.6 3 15 26 10 13 *** 8 *** *** 15 Y Hoquiam combined sewer overflows.											
GYS015 C WA-22-0020 Grays Hrb nr N Whitcomb Flats A 80.3 2 9 21 4 4 *** 1 *** *** 8 Y Hoquiam combined sewer overflows.											
GYS016 C WA-22-0020 Grays Harbor near Damon Point A 80.3 2 9 29 4 0 *** 3 *** *** 14 Y Hoquiam combined sewer overflows.											
HCB003 C WA-PS-0110 Hood Canal at Eldon AA 78.1 3 7 54 10 1 *** 1 *** *** 33 N Hoquiam combined sewer overflows.											
HCB004 C WA-PS-0110 Hood Canal at Sisters Point AA 78.1 2 11 64 9 1 *** 1 *** *** 40 N Hoquiam combined sewer overflows.											
NRR001 C WA-PS-0060 Tacoma Narrows nr Pt Defiance AA 108.7 3 8 26 6 1 *** 1 *** *** 13 N Influence from Commencement Bay?											
NSQ001 C WA-PS-0080 Nisqually Reach @ Nisqually R. AA 52.1 3 10 28 10 5 *** 1 *** *** 15 N Nisqually River. Agr runoff.											
NSQ002 H WA-PS-0080 Nisqually Reach nr Devil's Hd AA 0.0 1 8 10 4 0 *** 1 *** *** 5 N Nisqually River. Agr runoff.											
OAK004 C WA-14-0040 Oakland Bay nr Eagle Point A 4.7 3 17 30 14 8 *** 3 *** *** 17 Y Shallow water. Wood products industry.											
PAH003 C WA-18-0020 Pt Angeles Hbr @ Ediz Hook Hd A 4.0 2 1 40 22 3 *** 1 *** *** 26 N Development. Slow circulation. SIP. Urban runoff. Agriculture.											
PAH003 C WA-18-0010 Port Angeles Hbr @ Horse Creek AA 333.6 2 2 36 6 5 *** 1 *** *** 19 N Naturally low oxygen.											
											Upstream recreational development (inadequate septic systems). Naturally low oxygen.

Table 2. 1990 Water Segment Analysis Using the Water Quality Index. Sorted by Department of Ecology Region and station number.
****** indicates insufficient data, 'C' and 'W' by station number indicate data is current (last three years) or historical (last eight years), respectively.**

Station Number	WATs Number	Station Name	Seg. in Class (mi)	Seg. Yrs	Size in	Susp Ammonium	Oxygen	Comments and Possible Sources
					Temp	pH	Bact	
					Oxy	Nutr	Turb	all
PCK001 C	WA-14-0010	Pickering Pass nr Harstene Is.	A	14.2	2	12	28	Naturally low oxygen.
TOT001 C	WA-14-0030	Totten Inlet near Windy Point	A	9.5	3	15	30	Land development. Septic systems.
WPA001 C	WA-24-0020	Willapa River at Raymond	A	11.8	3	23	21	Raymond and South Bend STP's (recently connected). Inadequate septic systems.
WPA003 C	WA-24-0020	Willapa River @ Johnson Slough	A	94.4	3	20	28	Raw sewage. Low flows. Agriculture.
WPA004 C	WA-24-0020	Willapa Bay at Toke Point	A	0.0	3	12	29	Raymond and South Bend STP's (recently corrected). Inadequate septic systems.
								Raw sewage. Low flows. Shallow.
								Agriculture.
								Naturally low oxygen. Upwelling.

Table 3. The ten stations receiving the highest Water Quality Index (indicating low water quality) for each category.

Station Number	Current	Station Name	Ecology Region	Eco-Class	Region	WQI
Temperature						
*32A070	C	Walla Walla R nr Touchet	E	A	7	45
*32B070	C	Touchet R @ Touchet	E	A	7	42
*37A090	C	Yakima R @ Kiona	C	A	7	38
41B071	C	Winchester Wasteway @ Gage	E	A	7	37
41A070	C	Crab Cr nr Beverly	E	B	7	34
33A050	C	Snake R @ Burbank	E	A	7	32
41A101	C	Crab Creek @ McMannon Road	E	B	7	31
*57A190	C	Spokane R nr Post Falls	E	A	7	31
*56A070	C	Hangman Cr @ Mouth	E	A	7	31
*49A190	C	Okanogan R @ Oroville	C	A	7	31
Oxygen						
09E070	C	Mill Creek @ Orillia	N	A	2	86
09G071	C	Springbrook Cr. @ N. end Longacres	N	A	2	70
*HCB004	C	Hood Canal at Sisters Point	S	AA	A	64
09E090	C	Mill Creek - Kent on W Valley Hwy	N	A	2	61
PSS008	C	Pt Gardner Bay at Pier 3	N	B	A	54
*HCB003	C	Hood Canal at Eldon	S	AA	B	54
*HCB002	C	Hood Canal at Pulali Point	N	AA	A	54
SUZ001	C	Port Susan at Kayak Point	N	A	A	46
PSS015	C	Snohomish R at Highway 99 Brdg	N	A	A	46
PSS020	C	Ebey Slough near Marysville	N	A	A	43
pH						
PSS015	C	Snohomish R at Highway 99 Brdg	N	A	A	34
PSS020	C	Ebey Slough near Marysville	N	A	A	31
*32B070	C	Touchet R @ Touchet	E	A	7	29
*32A070	C	Walla Walla R nr Touchet	E	A	7	29
*56A070	C	Hangman Cr @ Mouth	E	A	7	27
45A070	C	Wenatchee R @ Wenatchee	C	A	7	27
*34A070	C	Palouse R @ Hooper	E	B	7	26
41A070	C	Crab Cr nr Beverly	E	B	7	25
49A190	C	Okanogan R @ Oroville	C	A	7	24
08B110	C	Sammamish R @ Redmond	N	AA	2	23

* Indicates stations that were in the top ten in the same category in the 1988 WQI.
 Ecoregion is based on Omernik and Gallant (1986).

Table 3. Continued.

Station Number	Current	Station Name	Ecology Region	Eco- Class	Region	WQI
Bacteria						
*34B110	C	SF Palouse R @ Pullman	E	A	7	76
09E090	C	Mill Creek - Kent on W Valley Hwy	N	A	2	60
24B130	C	Willapa R @ Lebam	S	A	1	59
*GYS006	H	Grays Hbr at E End Rennie Is.	S	B	A	57
09E070	C	Mill Creek @ Orillia	N	A	2	55
01D070	C	Sumas R nr Huntingdon BC	N	A	2	50
08B070	C	Sammamish R @ Bothell	N	AA	2	46
*PSS008	C	Pt Gardner Bay at Pier 3	N	B	A	42
09A060	C	Duwamish R @ Allentown Br	N	B	2	37
*ELB010	C	Duwamish Waterway @ 16th St Br	N	B	A	35
Nutrients						
*34B110	C	SF Palouse R @ Pullman	E	A	7	100
09E070	C	Mill Creek @ Orillia	N	A	2	50
*34A070	C	Palouse R @ Hooper	E	B	7	45
41C071	C	Frenchman Hills Wasteway @ Gage	E	A	7	45
09E090	C	Mill Creek - Kent on W Valley Hwy	N	A	2	45
09G071	C	Springbrook Cr. @ N. end Longacres	N	A	2	43
*01D070	C	Sumas R nr Huntingdon BC	N	A	2	39
*37A090	C	Yakima R @ Kiona	C	A	7	37
*41A070	C	Crab Cr nr Beverly	E	B	7	34
*32A070	C	Walla Walla R nr Touchet	E	A	7	34
Turbidity						
*34A070	C	Palouse R @ Hooper	E	B	7	46
*56A070	C	Hangman Cr @ Mouth	E	A	7	40
*32B070	C	Touchet R @ Touchet	E	A	7	28
41A110	H	Crab Cr nr Moses Lake	E	B	7	25
*34B110	C	SF Palouse R @ Pullman	E	A	7	25
26D070	C	Toutle R nr Castle Rock	S	A	2	25
10A110	C	Puyallup R @ Orting	S	A	2	25
10A070	C	Puyallup R @ Meridian St	S	A	2	25
09G071	C	Springbrook Cr. @ N. end Longacres	N	A	2	22
09E070	C	Mill Creek @ Orillia	N	A	2	22

Table 3. Continued.

Station Number	Current	Station Name	Ecology Region	Eco- Class	Region	WQI
Suspended Solids						
*34A070	C	Palouse R @ Hooper	E	B	7	59
39A041	H	Yakima River below Roza Dam	C	A	7	43
*32B070	C	Touchet R @ Touchet	E	A	7	43
*32A070	C	Walla Walla R nr Touchet	E	A	7	43
*41A070	C	Crab Cr nr Beverly	E	B	7	40
35B060	C	Tucannon R @ Powers	E	A	7	28
56A070	C	Hangman Cr @ Mouth	E	A	7	26
41C071	C	Frenchman Hills Wasteway @ Gage	E	A	7	25
*26D070	C	Toutle R nr Castle Rock	S	A	2	25
21D070	H	NF Quinault R @ Amanda (USGS)	S	AA	1	25
Ammonia Toxicity						
56A070	C	Hangman Cr @ Mouth	E	A	7	26
54A120	C	Spokane R @ Riverside State Pk	E	A	8	24
34B110	C	SF Palouse R @ Pullman	E	A	7	23
34A070	C	Palouse R @ Hooper	E	B	7	23
41C071	C	Frenchman Hills Wasteway @ Gage	E	A	7	22
41A101	C	Crab Creek @ McMannon Road	E	B	7	21
41B071	C	Winchester Wasteway @ Gage	E	A	7	21
09E070	C	Mill Creek @ Orillia	N	A	2	21
62A080	H	Pend Oreille R @ Border (USGS)	E	A	8	21
Overall						
*34B110	C	SF Palouse R @ Pullman	E	A	7	100
09E070	C	Mill Creek @ Orillia	N	A	2	93
09E090	C	Mill Creek - Kent on W Valley Hwy	N	A	2	91
09G071	C	Springbrook Cr. @ N. end Longacres	N	A	2	70
*34A070	C	Palouse R @ Hooper	E	B	7	62
*41A070	C	Crab Cr nr Beverly	E	B	7	61
*PSS008	C	Pt Gardner Bay at Pier 3	N	B	A	53
*PSS015	C	Snohomish R at Highway 99 Brdg	N	A	A	49
32A070	C	Walla Walla R nr Touchet	E	A	7	47
SUZ001	C	Port Susan at Kayak Point	N	A	A	46

CHRISTINE O. GREGOIRE
Director



Dave H.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

7171 Cleanwater Lane, Building 8, LH-14 • Olympia, Washington 98504

January 18, 1991

TO: Dick Cunningham
FROM: David Hallock *DA*
SUBJECT: 1990 Water Quality Index Analysis

Table 3 in my memo to Dick Cunningham dated July 18, 1990, (Results of the 1990 Water Quality Index Analysis) incorrectly states that no station had an ammonia toxicity value over 20. In fact, nine stations had ammonia toxicity scores greater than 20. A revised Table 3 is attached.

DH:blt
Attachment

cc: Lynn Singleton
Brad Hopkins
Joe Joy
Steve Saunders

Bob Barwin, CRO
Carl Nuechterlien, ERO
Bill Bachous, SWRO
John Glynn, NWRO

Table 3. The ten stations receiving the highest Water Quality Index (indicating low water quality) for each category.

Station Number	Current	Station Name	Ecology Region	Eco-Class	Region	WQI
Temperature						
*32A070	C	Walla Walla R nr Touchet	E	A	7	45
*32B070	C	Touchet R @ Touchet	E	A	7	42
*37A090	C	Yakima R @ Kiona	C	A	7	38
41B071	C	Winchester Wasteway @ Gage	E	A	7	37
41A070	C	Crab Cr nr Beverly	E	B	7	34
33A050	C	Snake R @ Burbank	E	A	7	32
41A101	C	Crab Creek @ McMannon Road	E	B	7	31
*57A190	C	Spokane R nr Post Falls	E	A	7	31
*56A070	C	Hangman Cr @ Mouth	E	A	7	31
*49A190	C	Okanogan R @ Oroville	C	A	7	31
Oxygen						
09E070	C	Mill Creek @ Orillia	N	A	2	86
09G071	C	Springbrook Cr. @ N. end Longacres	N	A	2	70
*HCB004	C	Hood Canal at Sisters Point	S	AA	A	64
09E090	C	Mill Creek - Kent on W Valley Hwy	N	A	2	61
PSS008	C	Pt Gardner Bay at Pier 3	N	B	A	54
*HCB003	C	Hood Canal at Eldon	S	AA	B	54
*HCB002	C	Hood Canal at Pulali Point	N	AA	A	54
SUZ001	C	Port Susan at Kayak Point	N	A	A	46
PSS015	C	Snohomish R at Highway 99 Brdg	N	A	A	46
PSS020	C	Ebey Slough near Marysville	N	A	A	43
pH						
PSS015	C	Snohomish R at Highway 99 Brdg	N	A	A	34
PSS020	C	Ebey Slough near Marysville	N	A	A	31
*32B070	C	Touchet R @ Touchet	E	A	7	29
*32A070	C	Walla Walla R nr Touchet	E	A	7	29
*56A070	C	Hangman Cr @ Mouth	E	A	7	27
45A070	C	Wenatchee R @ Wenatchee	C	A	7	27
*34A070	C	Palouse R @ Hooper	E	B	7	26
41A070	C	Crab Cr nr Beverly	E	B	7	25
49A190	C	Okanogan R @ Oroville	C	A	7	24
08B110	C	Sammamish R @ Redmond	N	AA	2	23

* Indicates stations that were in the top ten in the same category in the 1988 WQI.
 Ecoregion is based on Omernik and Gallant (1986).

Table 3. Continued.

Station Number	Current	Station Name	Ecology Region	Eco- Class	Region	WQI
Bacteria						
*34B110	C	SF Palouse R @ Pullman	E	A	7	76
09E090	C	Mill Creek - Kent on W Valley Hwy	N	A	2	60
24B130	C	Willapa R @ Lebam	S	A	1	59
*GYS006	H	Grays Hbr at E End Rennie Is.	S	B	A	57
09E070	C	Mill Creek @ Orillia	N	A	2	55
01D070	C	Sumas R nr Huntingdon BC	N	A	2	50
08B070	C	Sammamish R @ Bothell	N	AA	2	46
*PSS008	C	Pt Gardner Bay at Pier 3	N	B	A	42
09A060	C	Duwamish R @ Allentown Br	N	B	2	37
*ELB010	C	Duwamish Waterway @ 16th St Br	N	B	A	35
Nutrients						
*34B110	C	SF Palouse R @ Pullman	E	A	7	100
09E070	C	Mill Creek @ Orillia	N	A	2	50
*34A070	C	Palouse R @ Hooper	E	B	7	45
41C071	C	Frenchman Hills Wasteway @ Gage	E	A	7	45
09E090	C	Mill Creek - Kent on W Valley Hwy	N	A	2	45
09G071	C	Springbrook Cr. @ N. end Longacres	N	A	2	43
*01D070	C	Sumas R nr Huntingdon BC	N	A	2	39
*37A090	C	Yakima R @ Kiona	C	A	7	37
*41A070	C	Crab Cr nr Beverly	E	B	7	34
*32A070	C	Walla Walla R nr Touchet	E	A	7	34
Turbidity						
*34A070	C	Palouse R @ Hooper	E	B	7	46
*56A070	C	Hangman Cr @ Mouth	E	A	7	40
*32B070	C	Touchet R @ Touchet	E	A	7	28
41A110	H	Crab Cr nr Moses Lake	E	B	7	25
*34B110	C	SF Palouse R @ Pullman	E	A	7	25
26D070	C	Toutle R nr Castle Rock	S	A	2	25
10A110	C	Puyallup R @ Orting	S	A	2	25
10A070	C	Puyallup R @ Meridian St	S	A	2	25
09G071	C	Springbrook Cr. @ N. end Longacres	N	A	2	22
09E070	C	Mill Creek @ Orillia	N	A	2	22

Table 3. Continued.

Station Number	Current	Station Name	Ecology Region	Eco-Class	Region	WQI
Suspended Solids						
*34A070	C	Palouse R @ Hooper	E	B	7	59
39A041	H	Yakima River below Roza Dam	C	A	7	43
*32B070	C	Touchet R @ Touchet	E	A	7	43
*32A070	C	Walla Walla R nr Touchet	E	A	7	43
*41A070	C	Crab Cr nr Beverly	E	B	7	40
35B060	C	Tucannon R @ Powers	E	A	7	28
56A070	C	Hangman Cr @ Mouth	E	A	7	26
41C071	C	Frenchman Hills Wasteway @ Gage	E	A	7	25
*26D070	C	Toutle R nr Castle Rock	S	A	2	25
21D070	H	NF Quinault R @ Amanda (USGS)	S	AA	1	25
Ammonia Toxicity						
56A070	C	Hangman Cr @ Mouth	E	A	7	26
54A120	C	Spokane R @ Riverside State Pk	E	A	8	24
34B110	C	SF Palouse R @ Pullman	E	A	7	23
34A070	C	Palouse R @ Hooper	E	B	7	23
41C071	C	Frenchman Hills Wasteway @ Gage	E	A	7	22
41A101	C	Crab Creek @ McMannon Road	E	B	7	21
41B071	C	Winchester Wasteway @ Gage	E	A	7	21
09E070	C	Mill Creek @ Orillia	N	A	2	21
62A080	H	Pend Oreille R @ Border (USGS)	E	A	8	21
Overall						
*34B110	C	SF Palouse R @ Pullman	E	A	7	100
09E070	C	Mill Creek @ Orillia	N	A	2	93
09E090	C	Mill Creek - Kent on W Valley Hwy	N	A	2	91
09G071	C	Springbrook Cr. @ N. end Longacres	N	A	2	70
*34A070	C	Palouse R @ Hooper	E	B	7	62
*41A070	C	Crab Cr nr Beverly	E	B	7	61
*PSS008	C	Pt Gardner Bay at Pier 3	N	B	A	53
*PSS015	C	Snohomish R at Highway 99 Brdg	N	A	A	49
32A070	C	Walla Walla R nr Touchet	E	A	7	47
SUZ001	C	Port Susan at Kayak Point	N	A	A	46